

# An Economist Strikes Back! What Did the Global Financial Crisis Really Tell Us About Capital Market Efficiency and Financial Mathematics?

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## *The 'death' of Economics?*

- Popular Belief: conventional economics has 'failed'!
  - failed to predict the GFC
  - failed to prevent the GFC
  - caused the GFC.

## *The critics*

- “Last year, everything [in economics] came apart.”  
Paul Krugman (Nobel prize-winning economist, journalist)
- “Economics is extremely unhealthy at all levels, from introductory pedagogy to high research. As the global economy enters what could well be the Second Great Depression, economic theory is as useless a guide to how the economy actually functions as it was in the late 1920s.”  
Steve Keen (Australian economist)

## *Two particular culprits*

- But the favourite whipping boys resided in financial economics:
  - efficient markets hypothesis (EMH)
  - extensive use of mathematics in finance (both practitioners and academics)

## *The EMH is dead, buried, and unlamented ... isn't it?*

- To put it bluntly, [the] efficient market hypothesis does not work. It never has. Markets are not self-correcting.

Louis Uchitelle (journalist)

- "The demise of Lehman Brothers conclusively falsifies the efficient market hypothesis."

George Soros (Fund manager and speculator)

- [The GFC] proves the myth of efficient markets.

Nick Smith (journalist)

## *Not to mention deeply disliked...*

- The upside of the [GFC] is that it could drive a stake through the heart of the academic nostrum known as the efficient market hypothesis.

Roger Lowenstein (author, journalist)

- The incredibly inaccurate efficient market theory [caused] a lethally dangerous combination of asset bubbles, lax controls, pernicious incentives and wickedly complicated instruments [that] led to our current plight.

Jeremy Grantham (financial analyst, fund manager)

# EMH: 'Security prices reflect all available information'

## Implications:

NO: All investors are rational.

NO: Market prices will be predictable and stable.

NO: Market prices are always right.

YES: No investor has an information advantage.

YES: Market prices will be unpredictable and volatile.

YES: It's impossible to tell whether market prices are right or wrong.

YES: It's impossible to consistently beat the market, net of the costs of acquiring information.

*But many try...*

### 35 Fund Classes: End-year 2008 (S&P)

	1 year	3 year	5 year
Funds - Index (pp)	-4.1	-1.9	-1.5
%(Funds - Index) < 0	89	91	94

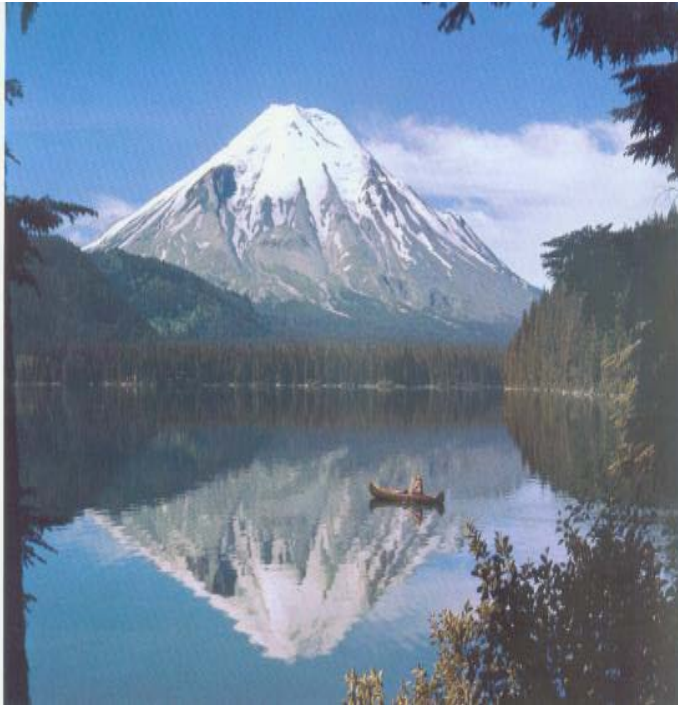
"The belief that bear markets favor active management is a myth."



# *The GFC proves the EMH is rubbish. Or does it...?*

- Collapse of large and venerable institutions couldn't happen in an 'efficient market' (Soros)
  - Confuses efficiency with stability
- Financial economists didn't predict the GFC
  - Confuses efficiency with predictability
  - Financial markets *did* predict trouble
- The collapse all happened at once
  - Confuses efficiency with stability
- The obvious asset price bubble couldn't happen in an 'efficient market'
  - Confuses efficiency with predictability

*Now this is a Bubble!*



57 people were killed, but no reports on the ‘death of volcanology’

## *Did the EMH cause the GFC?*

- Belief in the EMH by traders and regulators caused the GFC to happen
  - 'price is right' argument
  - blaming instrument for the sins of musician
- But is the EMH too easily misinterpreted?
- Practitioners have never believed in the EMH - 'easy to beat the market'.
- And regulators didn't behave as though they believed in the EMH - quite the opposite.
- **If anything, it was a *failure to believe in the EMH* that contributed to the GFC!**

## *Mathematics is the curse of economics ... isn't it?*

- “Economists as a group mistook beauty, clad in impressive-looking mathematics, for truth.”

Paul Krugman

- “In their desire for mathematical order and elegant models, the economic establishment played down the role of bad behaviour.”

Jeremy Grantham

- “It should be obvious to anyone with common sense that every financial [mathematics] axiom is wrong, and that finance can never in its wildest dreams be Euclid.”

Paul Wilmott (financial consultant)

- “One result of the collapse [is that] Li’s Gaussian copula formula [used to price CDOs] will go down in history as instrumental in causing the unfathomable losses that brought the world financial system to its knees.”

Felix Salmon (journalist)

*The use of maths in finance is  
useless - 'physics envy'*



## *What happens when it breaks down?*

- Government enquiries and public hearings?
- Drafting of new legislation and regulation over the management, staffing and organisation of particle accelerators, primarily by non-physicists?
- Compensation limits imposed on senior Hadron physicists?
- 'The death of physics'?

*Yet the Large Hadron Collider is a simpler system than the financial system.*

## *A curse – or a blessing?*

- Worlds of business and finance inherently numerical
  - proceeding without maths is like driving in the dark with your lights off
- What's the alternative - purely literary exposition?
  - fine for the big picture, but hopeless for detail of complex systems
  - maths makes clear exactly what's being assumed and that any conclusions follow logically from those assumptions
  - no such discipline imposed by prose
- Mathematical models are approximations, but surely better to be partly right than totally wrong.



*But did an over-reliance on maths in financial markets cause the GFC by over-simplifying the real world?*

### ***Individuals***

- More mathematically illiterate much more likely to default on sub-prime mortgage. (Fed Reserve - Atlanta).

### ***Institutions***

- "Another [reason bankers weren't aware of their risks] was that the quants, who should have been more aware of the copula's weaknesses, weren't the ones making the big asset-allocation decisions. Their managers, who made the actual calls, lacked the math skills to understand what the models were doing or how they worked. They could, however, understand something as simple as a single correlation number. That was the problem."

Felix Salmon

### ***Regulators***

- Madoff's returns mathematically impossible.

**The problem was not too much maths in finance, but too much ignorance of maths by financial decision-makers!**



## *Where does all this leave us?*

- Do financial markets process info so well that the EMH is literally true?
  - GFC suggests probably not
  - but we knew that already!
- Do financial markets process info sufficiently well to preclude out-performance of the market?
  - GFC confirms that they do
- Can one place total reliance on mathematical models in financial markets?
  - GFC suggests probably not
  - but we knew that already!
- Should financial decisions ignore mathematical methods?
  - GFC confirms that this would be a 'bad thing'.

**GFC not a new and puzzling data point**

## *The bottom line*

### Two Lessons

- The case for Market Efficiency survives the GFC.
- Regulators, investors and finance professionals need to have a greater belief in EMH, not less!
- The case for a mathematics-based approach to finance survives the GFC.
- Individuals, firms and regulators need to make greater use of maths for financial decision-making, not less!

*But doesn't smoke indicate fire?  
Why is the EMH so reviled?*

Whose ox is being gored here?

- Politicians
  - preferable to blaming policies or people
- Practitioners
  - 'raison d'être' is beating the market
- Journalists
  - inherent suspicion of markets

*But there's an even more  
fundamental reason*

- Cognitive illusion.

“I used to work in financial betting (literally). Most of our business was premised on people not being able to predict future markets, and I made a lot of money from that turning out to be true. But I don't believe in EMH, particularly after the dotcom crash.”

Unknown contributor to online blog discussion

- Hard-wired belief: people who are smarter, more knowledgeable, and who work harder, should 'win'.
- But in financial markets, EMH says this isn't true.